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Science and Technology for Tomorrow's Air and Space Force

Success Story

EMBEDDED SYSTEM MODERNIZATION TECHNOLOGY REDUCES SUSTAINMENT COSTS FOR F-117A

Pilots from the F-117 Combined Test Force participated in the successful completion of six flight demonstrations testing the F-117A's mission software while using the reconfigurable processor for legacy application code execution (RePLACE) computer emulation technology. TRW, Inc. of Dayton, Ohio, developed the technology under the Reconfigurable Aerospace Computer Emulation (RACE) project. This new system was tested and flown for the first time as an avenue to reduce sustainment costs for the F-117A.

Accomplishment

The Information Directorate's Embedded Information Systems Engineering Branch developed the embedded information system re-engineering (EISR) capability. The directorate conducted the tests at the Edwards Air Force Base flight test range in California. The test included a portion of the F-117 operational flight program (OFP) software that was converted from JOVIAL to C programming language using the directorate's EISR project. The flight demonstrations collected flight test data to determine if the current implementation of emulation technology merits further development.

The flight demonstrations performed included a navigation checkout, weapons checkout with bomb dummy unit-33, navigation performance checkout, time-over-target/full-scale weapons (FSW) simulation, and FSW delivery with guided bomb unit-12. The resulting OFP function, along with the RACE/RePLACE emulator, ran successfully on the commercial processor. The demonstration marked the first time that re-engineered software converted from EISR was flown, and it successfully illustrated that RePLACE legacy and native functions could execute and communicate on the same processor.

Background

The Computer Resources Support Improvement program (CRSIP) sponsored the RACE project, seeking to address problems associated with legacy/obsolete embedded information systems by using and evaluating emulation technology hosted on the latest commercial processors. The RACE project is working with other customers, including the F-16 (SPO), the B-2 SPO, and the Special Operations Forces SPO. CRSIP also sponsored the EISR project, created to develop the automation-assisted JOVIAL-to-C re-engineering capability that permits simultaneous modernization of both the structure and source language of legacy-embedded system applications. In addition to the F-117 SPO, the EISR project has been working with the F-16 SPO. The directorate provides technical expertise and program management in the development and demonstration of embedded information system technologies to address sustainment issues associated with fielded legacy systems.

Additional information